

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (Currently amended) A target detection apparatus comprising:
an optical irradiation unit which irradiates light,
an optical interference unit comprising helical organic molecules each having a target capturing body bonded thereto, said helical organic molecules being aligned to form a film-like material, said film-like material having a refractive index, wherein said optical interference unit is capable of: interacting with a detection target, interfering with the light irradiated from the optical irradiation unit, radiating said light as interference light, and varying the wavelength of the interference light after interaction with the detection target, and
a wavelength change detecting unit placed in the path of the interference light which detects the wavelength variation of the interference light radiated by the optical interference unit,
wherein the optical interference unit further comprises a substrate, the film-like material being provided on the substrate, and the substrate comprising on a surface thereof an identical refractive index film having a refractive index that is substantially the same as the refractive index of the film-like material.

2. (Previously presented) The target detection apparatus according to Claim 1, wherein the wavelength change detecting unit transmits light of a specific wavelength, and can detect that light of the specific wavelength has been passed through.

3. (Previously presented) The target detection apparatus according to Claim 2, wherein the wavelength change detecting unit comprises an interference filter, and an optical detection sensor which can detect light which has passed through the interference filter.

4. (Previously presented) The target detection apparatus according to Claim 1, wherein the wavelength change detecting unit measures a spectrum before wavelength change of the interference light and a spectrum after wavelength change of the interference light, and can measure their differential spectrum.

5. (Previously presented) The target detection apparatus according to Claim 4, wherein the wavelength change detecting unit transforms the differential spectrum into a spectral intensity, and can amplify the spectral intensity.

6. (Previously presented) The target detection apparatus according to Claim 4, wherein the wavelength change detecting unit is a spectrophotometer.

7. (Previously presented) The target detection apparatus according to Claim 1, wherein the optical interference unit radiates interference light as at least one selected from a reflected light and a transmitted light.

8. (Canceled)

9. (Canceled)

10. (Previously presented) The target detection apparatus according to Claim 1, wherein each of the helical organic molecules is rod-shaped.

11. (Previously presented) The target detection apparatus according to Claim 10, wherein the film-like material is formed by a coating method.

12. (Currently amended) The target detection apparatus according to Claim 9~~1~~, wherein the substrate is formed from at least one of semiconductor, ceramics, metal, glass, and plastics.

13. (Canceled)

14. (Currently amended) The target detection apparatus according to Claim 9~~1~~, wherein the substrate further comprises on a surface thereof a different refractive index film having a

refractive index that is different from the refractive index ~~from the refractive index~~ of the film-like material.

15. (Previously presented) The target detection apparatus according to Claim 14, wherein the refractive index of the different refractive index film is different from a refractive index of the substrate.

16. (Previously presented) The target detection apparatus according to Claim 14, comprising a plurality of different refractive index films, refractive indices of the plurality of different refractive index films being mutually different.

17. (Previously presented) The target detection apparatus according to Claim 14, wherein the different refractive index film is a dielectric film.

18. (Currently amended) The target detection apparatus according to Claim 91, wherein the substrate is an interference filter.

19. (Previously presented) The target detection apparatus according to Claim 1, wherein at least a second film is formed on the surface of said film-like material.

20. (Previously presented) The target detection apparatus according to Claim 19, wherein said second film has a refractive index substantially the same as the refractive index of the substrate surface in contact with the film-like material.

21. (Previously presented) The target detection apparatus according to Claim 1, wherein the thickness of the film-like material is from 50nm to 1 μ m.

22. (Previously presented) The target detection apparatus according to Claim 1, wherein the film-like material is one of a monomolecular layer and a laminated film of the monomolecular layer.

23. (Canceled)

24. (Canceled)

25. (Previously presented) The target detection apparatus according to Claim 1, wherein the helical organic molecules are alpha-helix polypeptides.

26. (Canceled)

27. (Previously presented) The target detection apparatus according to Claim 1, wherein the target capturing body is capable of interacting with the detection target by at least one selected from physical adsorption and chemical adsorption.

28. (Canceled)

29. (Previously presented) The target detection apparatus according to Claim 1, wherein the target capturing body is at least one selected from enzyme, coenzyme, enzyme substrate, enzyme inhibitor, a clathrate compound, metal, antibody, antigen, protein, microorganism, virus, cell debris, metabolic product, nucleic acid, hormone, hormone receptor, lectin, sugar, physiologically active substance and physiologically active substance-receptor.

30. (Previously presented) The target detection apparatus according to Claim 29, wherein:

the clathrate compound is further selected from a monomolecular host compound, a polymolecular host compound, a polymer host compound, and an inorganic host compound;

the monomolecular host compound is further selected from cyclodextrin, a crown compound, cyclophane, azacyclophane, calixarene, cyclotrimeratrylene, spherand, cavitand and, cyclic oligopeptide;

the polymolecular host compound is further selected from urea, thiourea, deoxycholic acid, perhydrotriphenylene, and tri-o-thymotide;

the polymer host compound is further selected from cellulose, starch, chitin, chitosan, and polyvinyl alcohol; and

the inorganic host compound is further selected from an interlayer compound, zeolite, and a Hofmann complex.

31. (Currently amended) The target detection apparatus according to Claim 2728, wherein the detection target is avidin, and the target capturing body is biotin.

32. (Previously presented) The target detection apparatus according to Claim 1, wherein the optical irradiation unit can irradiate a pencil light beam.

33. (Previously presented) The target detection apparatus according to Claim 1, wherein the optical irradiation unit is a laser irradiation device.

34. (Currently amended) A target detection substrate comprising:
an optical interference unit comprising helical organic molecules each having a target capturing body bonded thereto, said helical organic molecules being aligned to form a film-like material, said film-like material having a refractive index; and
a substrate,

wherein the film-like material is provided on the substrate, and the target detection substrate is capable of interacting with a detection target, interfering with irradiated light and

radiating the light as interference light, and changing the wavelength of the interference light after interacting with the detection target, and

the substrate comprises on a surface thereof an identical refractive index film having a refractive index that is substantially the same as the refractive index of the film-like material.

35. (Previously presented) The target detection substrate according to Claim 34, wherein the interaction is at least one selected from physical adsorption and chemical adsorption.

36. (Previously presented) The target detection substrate according to Claim 34, wherein the interference light is radiated as at least one of reflected light and transmitted light.

37. (Previously presented) The target detection substrate according to Claim 34, wherein each of the helical organic molecules is rod-shaped.

38. (Previously presented) The target detection substrate according to Claim 34, wherein the substrate is formed from at least one of semiconductor, ceramics, metal, glass, and plastics.

39. (Canceled)

40. (Currently amended) The target detection substrate according to Claim 34, wherein the substrate further comprises on a surface thereof a different refractive index film having a

refractive index that is different ~~refractive index~~ from the refractive index of the film-like material.

41. (Previously presented) The target detection substrate according to Claim 40, wherein the refractive index of the different refractive index film is different from a refractive index of the substrate.

42. (Previously presented) The target detection substrate according to Claim 40, comprising a plurality of different refractive index films, refractive indices of the plurality of different refractive index films being mutually different.

43. (Previously presented) The target detection substrate according to Claim 40, wherein the different refractive index film is a dielectric film.

44. (Previously presented) The target detection substrate according to Claim 34, wherein the substrate is an interference filter.

45. (Previously presented) The target detection substrate according to Claim 34, wherein at least one dielectric film is further formed on the surface of the film-like material.

46. (Previously presented) The target detection substrate according to Claim 34, wherein the thickness of the film-like material is from 50nm to 1 μ m.

47. (Previously presented) The target detection substrate according to Claim 34, wherein the film-like material is one of a monomolecular layer and a laminated film of the monomolecular layer.

48.-49. (Canceled)

50. (Previously presented) The target detection substrate according to Claim 34, wherein the helical organic molecules are alpha-helix polypeptides.

51. (Currently amended) A target detection method comprising the steps of:

(a) irradiating light to an optical interference unit that is capable of interacting with a detection target, and radiating the light as interference light;

said optical interference unit comprising helical organic molecules each having a target capturing body bonded thereto, and said helical organic molecules being aligned to form a film-like material, said film-like material having a refractive index,

wherein said optical interference unit further comprises a substrate, the film-like material being provided on the substrate, and the substrate comprising on a surface thereof an identical

refractive index film having a refractive index that is substantially the same as the refractive index of the film-like material, and

(b) detecting a wavelength change of the interference light upon capture of said detection target by said optical interference unit.

52. (Previously presented) The target detection method according to Claim 51, wherein the optical interference unit can change the wavelength of the interference light after interaction with the detection target.

53. (Currently amended) The target detection method according to Claim 51, ~~wherein the optical interference unit is a target detection substrate formed from a film-like material on a substrate,~~ wherein said optical interference unit is capable of: interacting with a detection target, interfering with irradiated light and radiating the light as interference light, and changing the wavelength of the interference light after interaction with the detection target.